



▲ **Geologist Frank Trusdell** of the U.S. Geological Survey determines the orientation of a lava core sample taken from a flow in Haleakala National Park. A rock's age is revealed by correlating the orientation of its minerals, determined at the time of formation, with gradual changes in the earth's magnetic field. This dating method was used in 1998 to update a geologic map used by interpreters at the Hawaii park.

# RESOURCE INTERPRETATION

Engendering public support for the natural resource management program of the National Park Service is critical to the long-term preservation of parks. Without it, resource managers are sure to face greater adversity and misunderstanding in their efforts to resolve the many issues facing parks today. To gain such support, the National Park Service is engaged in various activities that encourage visitors and park neighbors to learn about the role of science in park management. As the following reports for 1998 show, the most successful activities are designed specifically for this audience. They share the common approach of interpreting scientific information in nontechnical and engaging ways that stimulate consideration of the many challenges inherent in natural resource management. The benefits of resource interpretation are many: a better informed public and therefore empowered constituency of park supporters, a closer bond between parks and neighbors, and a public vested in the rational application of science in the care of park natural resources.

## Geology

### ▶ DOES ANYONE HERE SPEAK *jē-'ä-lə-jē*? GPRA

by Jim F. Wood and Sharon Ringsven

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**G**eology may be the most universal characteristic of national parks. Unfortunately, the geologic story of a park can be difficult to tell, especially since most parks do not have a staff geologist, and park interpreters need to be able to obtain and understand scientific information as the basis for their educational programs. In 1998 several scientists from the U.S. Geological Survey (USGS) stepped forward to help various parks interpret their geologic stories.

Formerly, the outreach and information programs of the U.S. Geological Survey were largely focused on providing technical information to planners and city engineers, but in recent years they have added goals that include connecting with the public and the nonscientist. The science bureau has realized that collaboration with parks is an ideal way to make this connection. Indeed, parks have much to offer in partnership with the USGS outreach program: professional interpreters, textbook geologic features, and a large audience who comes to parks to learn.

Haleakala National Park has been fortunate to work with USGS geologists from the Hawaiian Volcanoes

Observatory who use “common language.” These geologists spent several weeks in 1997 and 1998 mapping and dating lava flows in the park. Prior to this work, geologic interpretation of Haleakala was based on work completed 30–60 years ago. This new information will allow the park to interpret its geologic history more accurately. Renewed interest in Haleakala National Park by the Hawaiian Volcanoes Observatory and money available through the NPS Fee Demonstration Program have enabled park staff to reconstruct badly outdated geology exhibits. A relief model is being made that will not only show topography of the entire park but also the ages of summit lava flows as mapped by the USGS geologists.

Lake Mead National Recreation Area (Nevada and Arizona) and Mojave National Preserve (California) also received assistance from USGS geologists in 1998. The National Cooperative Geologic Mapping Program of the USGS Western Region hired a geology education specialist, Melanie Moreno, specifically to work with parks. As a geologist and a former science teacher, Moreno has a combination of subject-matter knowledge and communication skills that works well for geologic interpretation. She has made geologic information accessible to park interpreters by organizing geoscience field trips for park staff and geologists at the two desert parks. Moreno selected the geologists who participated and coached them in presenting introductory materials in nontechnical



*A geology professor on sabbatical from Oregon State University prepared geology training manuals during 1998 for three geologically significant parks: Crater Lake National Park (Oregon), Sunset Crater National Monument (Arizona), and Blue Ridge Parkway (Virginia and North Carolina). The manuals were written principally for park interpreters to assist them with the technical challenges of geology interpretation. Four more guides are planned for 1999.*



### **National park interpreters** have

perhaps the best opportunity of any federal employees to stand on-site and engage the public in learning about geology and its significance in defining a place. With the help of an interpretive ranger, children at a geology day camp in Capitol Reef National Park (Utah) contemplate an earlier time and the animal that left its footprints in stone.



The World Wide Web was the venue for an “electronic field trip” to Glacier National Park in November. The multimedia event united park scientists, students, and the public in exploring subjects ranging from the park grizzly bear population to the role of fire in the ecosystem. Researchers gave real-time oral presentations that complemented illustrations posted on the web, while interactive chats facilitated question-and-answer sessions, and 360-degree, panoramic photos depicted the park in an exciting way. A collaborative effort among School District 5 in Kalispell, Montana, the National Park Service, and the USGS Glacier Field Station, the field trip can still be experienced on the web at [www.sd5.k12.mt.us/glaciereft](http://www.sd5.k12.mt.us/glaciereft). As the partners have demonstrated, this cyberspace forum has great potential to reach a broad audience with a message about the role of science in park management.



language. This approach was successful and provided interpreters with the geology basics and background needed to answer commonly asked questions from visitors.

The USGS Cooperative Mapping Program also aided staff from Lake Mead, Mojave, and Sunset Crater Volcano National Monument (Arizona) in the development of park geology World Wide Web sites. Through web

technology, each park is now able to share its unique geologic resources with a growing audience of Internet users and provide its interpretive staff with a nontechnical interpreters' manual on park geology. The web page [www2.nature.nps.gov/grd/usgsnps/project/interp.html](http://www2.nature.nps.gov/grd/usgsnps/project/interp.html) provides links to each of these park geology websites and many other resources for developing interpretive geologic programs.

## Building Constituencies

# ► INTERPRETING THE LANDSCAPE THROUGH SCIENCE GPRA

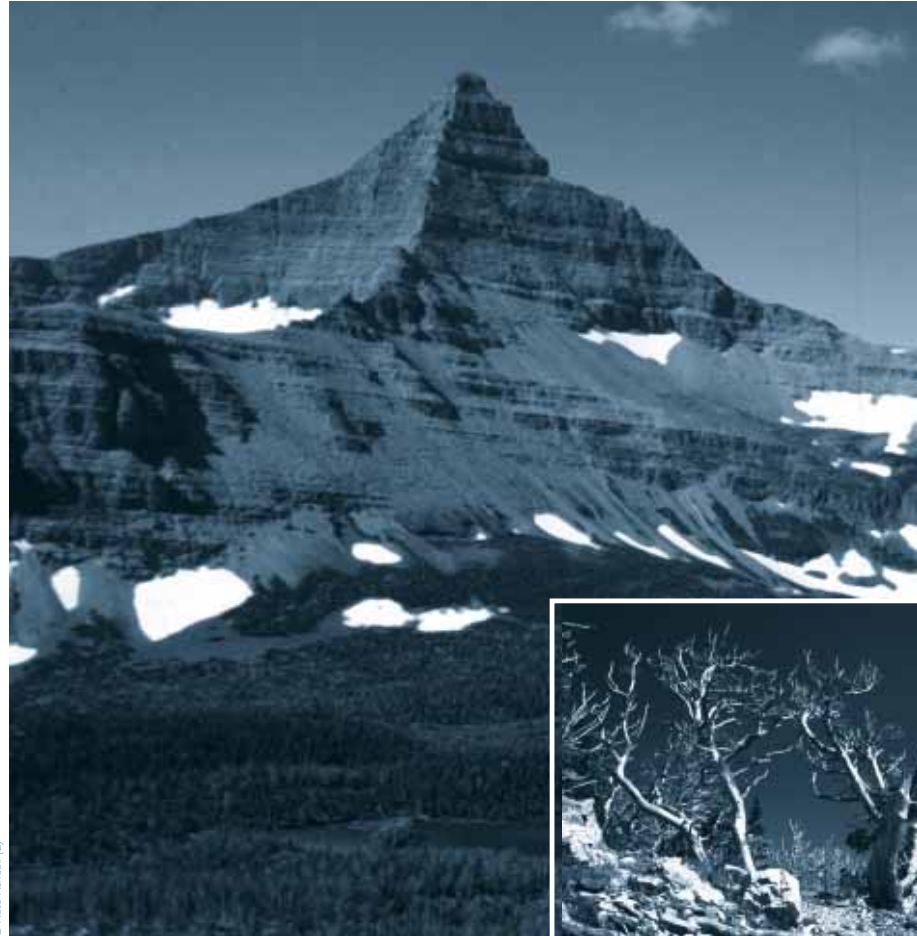
by Brace Hayden

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As biosphere reserve managers, officials at Glacier National Park, Montana, have a responsibility to foster research that provides land managers and adjacent communities with information regarding how to sustain the area's economies while protecting the park and adjacent wildlands. Park research has included cooperative efforts with two adjacent biosphere reserves, the Coram Experimental Forest in the Flathead National Forest and Waterton Lakes National Park in Alberta. Research findings are disseminated to agency managers and the research community via publications, seminars, and workshops. Research results are shared with the general public via local speaking engagements and park interpretive activities.

In 1998 the park tried a new approach to public outreach. In partnership with the Coram Experimental Forest, the Flathead Economic Policy Center, and seven other organizations, Glacier National Park sponsored the Flathead Living in the Landscape Community Celebration. In addition to a wide variety of activities designed to display the area's natural and human communities, the Flathead Celebration also included a conference entitled "Interpreting the Landscape Through Science," which involved presentations by scientists, resource managers, and local high school students. Extraordinary efforts were made to have the conference appeal to a broad segment of the local population. Registration was free, students were encouraged to bring their parents, and presenters were instructed to make their talks as nontechnical as possible and maximize opportunities for audience dialogue.

Approximately 120 citizens attended "Interpreting the Landscape Through Science," and judging by the frequency and depth of questions posed by the audience, the purpose of the conference was achieved. Conference proceedings are in press and will be distributed to participants, local school districts, natural resource agencies, and libraries. Major funding for the conference



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was provided by the U.S. Man and the Biosphere Program and by the U.S. Forest Service.

The idea for including a science conference in the array of celebration activities grew out of the desire to recognize the importance of 50 years of research at the Coram Experimental Forest, a milestone that was reached in 1998. Celebration planners saw the need to emphasize how the results of research at Coram, Glacier National Park, and elsewhere are applied by local land management officials to the benefit of the area's citizens. The involvement of local biosphere reserve managers and educators helped underscore the conference theme of linking the health of the area's natural resources to that of its human communities. Nine of the 24 presentations made during the two-day conference discussed research conducted in whole or in part within Glacier National Park.

▲ **The Glacier science conference** featured numerous presentations on current research topics and resource management issues, including the widespread decline in whitebark pine. A Eurasian fungus called blister rust is responsible for the problem and is creating ghost forests of five-needle pines throughout the West.

## ▶ THE INDISPENSABLE RESOURCE STEWARDSHIP CONFERENCES GPRA

by Fred Armstrong

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Sponsorship of scientific conferences and workshops by units of the national park system seems to be on the rise nationwide, demonstrating the awareness of the benefits of such meetings. In 1998 these gatherings facilitated timely dissemination of current information for resource management, provided exchange of ideas on early research results and innovative management, raised awareness of needed research, and initiated development of new studies. In such meetings, park staff come together with cooperators, partners, and colleagues. New working relations and channels for information exchange are formed and old ones renewed. Staff of the National Park Service and other governmental agencies, universities, and private enterprises shared expertise and experiences and pooled efforts to improve research and management. New participants quickly gained insights into the myriad facets of the NPS mission and the strengths and needs of parks. These gatherings were also great opportunities for public involvement and support of natural resource stewardship.

The history of the initial impetus behind park science conferences is as varied as the subject matter. Some began as presentations of collective and baseline research results by contracted or cooperating universities. A good example is the 1975 Biological Investigations in Guadalupe Mountains National Park conference, which developed just three years after the park's establishment. In 1998 the Guadalupe Mountains symposium was organized for the park's 25th anniversary to brief staff, other researchers, and the

public on scientific discoveries since presentation of the baseline studies. A similar 10th anniversary stewardship symposium was held in 1998 at El Malpais National Monument, New Mexico. Increasingly common at many of these forums are sessions that let park managers, researchers, and interest groups share their visions for stewardship and future research.

Several conferences have become annual or biennial successes. Parks in the Southern Arizona Group developed an annual conference that started as a management planning strategy between shared human and fiscal resources. This conference has expanded to include 10 parks, the Western Archeological and Conservation Center, and the Biological Resources Division of the U.S. Geological Survey. Its focus recently broadened to include interpretive applications. The North by Northwest Natural Resource Conference is another recurring meeting with a focus on regional resources. Its beginning was a planning workshop for the units under the previous Pacific Northwest Regional Office. The Alaska River Management Symposium in Anchorage, jointly sponsored by the National Park Service, Bureau of Land Management, and U.S. Forest Service, is another biennial workshop. It is held principally for outfitters, land managers, and academic and public interest groups. The annual two-day Beringia Days Conference in Alaska focuses on Russian and Alaskan regional biological and cultural richness and research issues. Several parks, such as Bandelier National Monument; Big Thicket National Preserve; Cape Cod National Seashore; and Big Bend, Glacier, and Yellowstone National Parks, held research and resource stewardship conferences in 1998. Others, such as Acadia, Shenandoah, and Great Smoky Mountains National Parks and New River Gorge National River, are planning their biennial 1999 workshops.

Many conferences in 1998 attracted nearly 200 participants each, and 20–60 presentations either targeted or were presented by park managers, interpreters, the public, academic cooperators, or scientific specialists. Many participants belong to the ranks of park staff and affiliated academic scientists. Registration revealed that attendance by representatives of other federal and state government agencies, private organizations, students, citizens, and other groups interested in the welfare of national parks has increased yearly.

From all appearances in 1998, resource stewardship conferences are eminently important sources of information for park staff who must meet the ever-mounting challenges of resource management now and into the next millennium.

**Attendees of the  
Guadalupe Mountains  
science conference participated  
in field trips, presentations,  
and poster sessions.**







▶ **The Biltmore stick**, used by foresters to calculate harvestable timber, combines the means to measure both height and diameter of trees in one simple instrument. Here, a participant in the Resource Acadia outreach program uses it to estimate tree height as part of a session exploring nonnative plant species, entitled "Green Invaders or Historic Treasures."

## ▶ RESOURCE ACADIA REACHES OUT TO AREA RESIDENTS GPRA

by Paul E. Super

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Twenty people picked their way along the edge of a small wetland with scattered blooming irises and stopped where the surrounding woodland opens into a vast freshwater marsh. The Acadia National Park botanist pointed out the location of a few persistent purple loosestrife plants and showed a picture of another wetland that is entirely overgrown by this invasive exotic. The people nodded their heads in understanding. These group members were park neighbors attending a Resource Acadia field seminar called "Acadia's Patchwork Forest Quilt." Their interest was a good indication that in 1998, as in previous years, Resource Acadia has made a difference.

First developed in 1993, Resource Acadia is an outreach program of field seminars that primarily targets residents of Acadia National Park's neighboring communities. Its mission is to join resource managers with researchers and interested park neighbors to increase public understanding and appreciation of the issues that affect resource management in the park. The seminar helped participants see park forests and wetlands as communities and highlighted the importance of using native species and cultivars for revegetation not only in the park but also around private residences. Other seminars in 1998

were about the decline of Neotropical migrant songbirds, mercury contamination of loons and freshwater fishes, and cultural resource issues.

Resource Acadia targets park neighbors because their actions can greatly affect a shared resource. Participants include reporters, teachers, local tour guides, and leaders of local associations. They can be recruited as management partners who provide valuable insight, assistance, and support for management initiatives and spread information throughout the community.

Resource Acadia programs are popular. In 1998 the number of participants per seminar usually exceeded 20. The programs continued to attract first-time participants; more than half of the participants were first-timers. On average, each participant attended 2.7 seminars.

A park interpreter designs, publicizes, and coordinates the seminars. Two related but seemingly conflicting issues may be presented, for example controlling invasive exotic plants while preserving apple trees and other historically important exotics. The primary presenters are researchers or resource managers. Formal presentations are supported by field trips to research sites. As one participant said, "You can't beat getting out into the resource with the experts!"

A limited number of training manuals are available upon request to those parks with an interest in starting a program like Resource Acadia.

## ► NATURE NOTES HIGHLIGHTS PARK RESOURCE INFORMATION FOR CRATER LAKE VISITORS

by Steve Mark

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Big Cypress National Preserve (Florida) published a brochure in 1998 that complements its 1996 Water Resource Management Plan. Resource managers and interpreters prepared the product, which is targeted to the public, with information on the preserve's water resources and the many associated management decisions. Meanwhile, in April the Department of the Interior (DOI)—Mexico Border Field Coordinating Committee published its third fact sheet, which identifies and discusses water quantity and quality issues along the U.S.-Mexico border and their impacts on DOI-administered lands. Entitled "Water Resource Issues in the Rio Grande—Rio Conchos to Amistad Reservoir Subarea," this fact sheet addresses issues in three Texas units of the national park system: Big Bend National Park, Rio Grande Wild and Scenic River, and Amistad National Recreation Area.

► **With its 50th edition published in 1998,** *Nature Notes from Crater Lake* has proven to be an effective means of communicating resource issues and values to park visitors. The publication appears annually and often features new discoveries important in resource management.

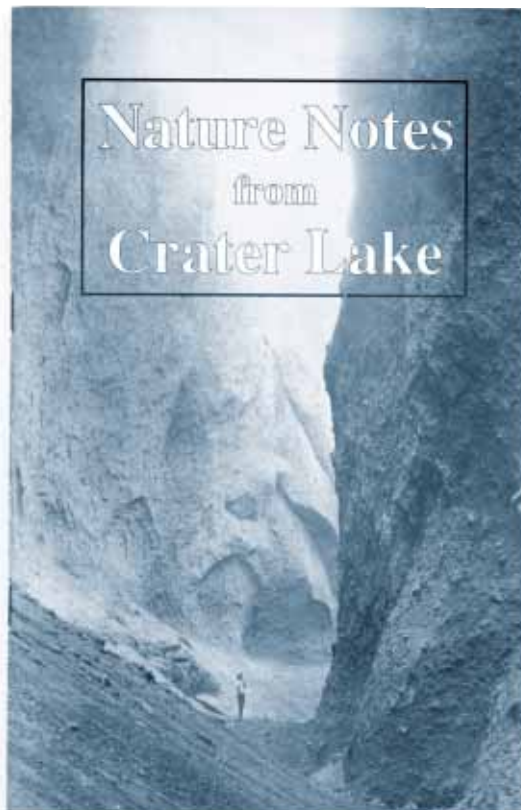
Interpreting resource management with publications is a challenge for staff in many parks. Peer-reviewed journals make important contributions to knowledge in a given field but reach a limited audience. Park newspapers, by contrast, are seen by thousands of visitors each year but lack the space to convey the importance of ongoing projects without oversimplification. Furthermore, information about resource management in newspapers competes with other types of messages. Articles appearing near the back of the newspaper may be perceived as relatively unimportant.

Publications sold through cooperating associations can play a vital role in communicating resource values and issues to visitors. Yet association offerings are dominated by commercial publications because of the need to generate

sales. Since these items usually focus on only the most recognized features of a given area, the range of topics considered economically viable in small and medium-sized parks is limited. However, park staff can reach the public directly with publications by cooperating associations. *Nature Notes from Crater Lake* is one such example, and has proven to be an excellent way of putting new discoveries and the significance of ongoing resource management before the visiting public.

Published annually by the Crater Lake Natural History Association, *Nature Notes* typically features 8–10 short articles. Recent articles include "A Furry Encounter" with a flying squirrel, a closer look at the "True Firs of Crater Lake National Park," and "Understanding the Bimodal Eruptions of Mount Mazama." The authors are resource management staff and other individuals knowledgeable about natural resources in the area. Each article is reviewed by subject experts to ensure the accuracy of the information. Although somewhat eclectic, *Nature Notes* is popular with those who repeatedly visit Crater Lake. It is an inexpensive publication that highlights important information about resources and their management and thereby enhances visits, even first-time visits, to the park.

The 50th issue of *Nature Notes from Crater Lake* appeared in 1998, but the series has a pedigree stretching back to 1928. After a hiatus lasting three decades, a 1992 symposium celebrating the park's 90th anniversary brought about a revived publication that has appeared every year since then. Copies of the most recent issues of *Nature Notes* are available at the two Crater Lake Natural History Association outlets in the park. Because they represent a valuable and entertaining, ongoing record, all articles in volumes since 1928 (text only) are readily accessible on the park's website at [www.nps.gov/crla/clnp-not.htm](http://www.nps.gov/crla/clnp-not.htm).



► **A research submersible (inset)** is lowered into Crater Lake by helicopter, signaling the start of a two-year study of this deep lake's thermal features, plants, and animals. Such scientific endeavors and their discoveries are typical grist for *Nature Notes from Crater Lake*, an annual publication of the Crater Lake Natural History Association that highlights important information about park resources and management for the visiting public.



